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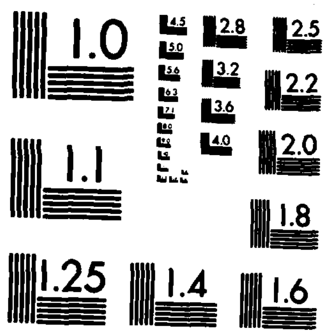

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Volume VII

Airport and Airway System Cost Allocation Model: User's Manual

J. C. SCALEA

SEPTEMBER 1977

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ABSTRACT

This volume constitutes the user's manual for the computer program written to automate the calculations involved in the allocation of costs to the various airport and airway system users. It includes a very brief summary of the allocation methodology which is developed in detail in previous volumes. The program itself is interactive in nature and this manual contains a summary of the commands and input data formats required by the user for successful program execution. A sample terminal session is included as well as a program listing and a sample of the output.

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

The computer program described in this volume assigns annual Federal Aviation Administration (FAA) costs to one of four user groups--air carriers, general aviation, military and the general public--using techniques developed by The MITRE Corporation for the Office of Aviation Policy, FAA. As input, the program requires costs subdivided into up to 40 budget categories, estimates of annual FAA aviation activity by user group, and user supplied directions on which of several allocation methods to use. Additional data are sometimes required depending upon which allocation technique is selected for each cost category.

This document describes the program's input requirements, user interactions, cost allocation techniques and output formats. Basic program logic is shown in Figure 1-1. Allocation parameters, aviation activity statistics and cost bases, unique to each case, form the input data base. The program applies an allocation methodology to the input data to produce a series of tables. These tables show annual cost allocations to each user group for each cost category. At the discretion of the user, the same data base can then be selectively modified and rerun to perform sensitivity analysis.

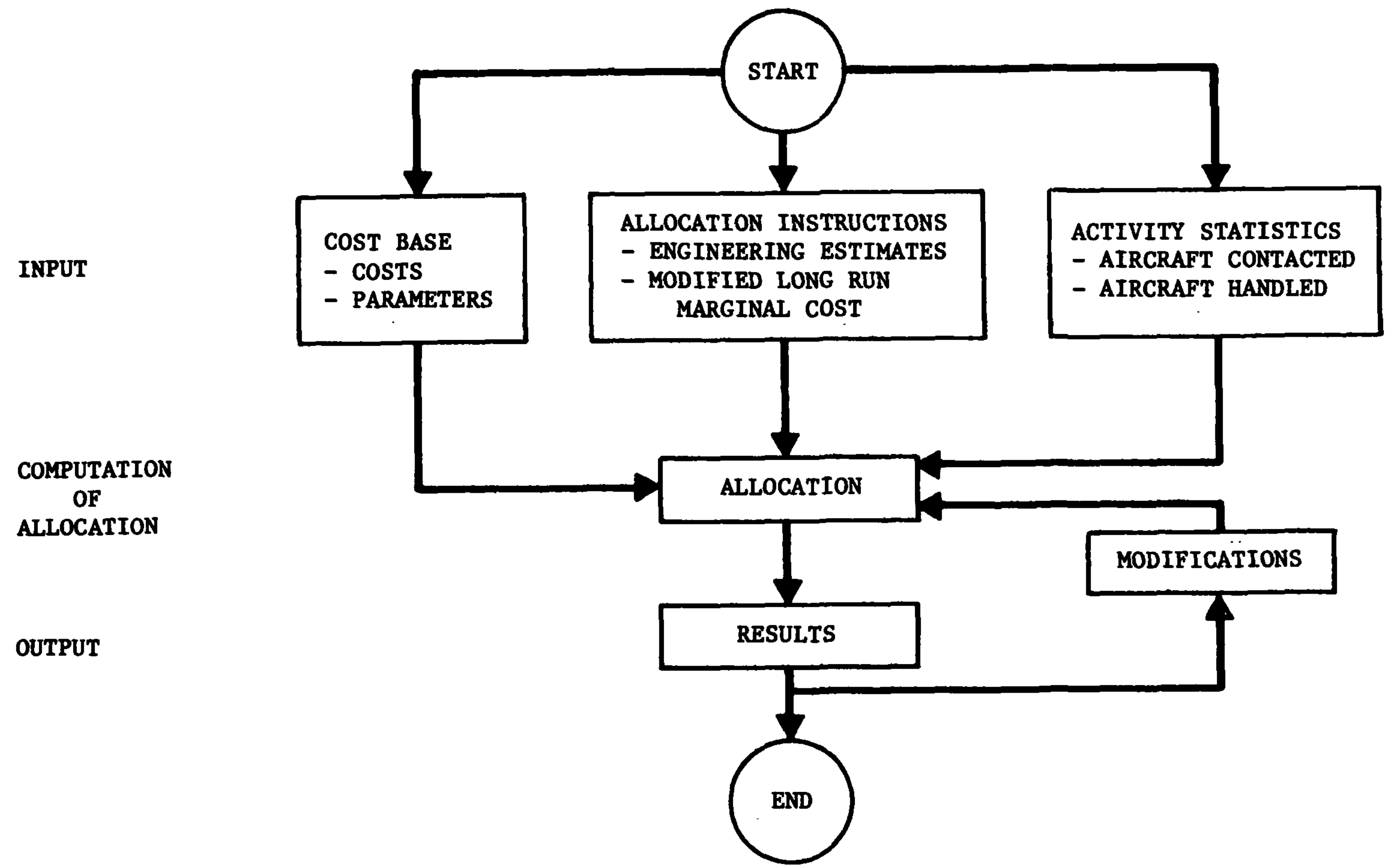

FIGURE 1-1
BASIC LOGIC OF ALLOCATION PROGRAM PACKAGE

2. PROGRAM OVERVIEW

The program package is divided into two major tasks--allocation and modification--and four minor tasks, which deal with input and output. The allocation and modification tasks, being central to the purpose of the program, are described in this section.

2.1 Allocation

Allocation involves assigning of a portion of each cost in the cost base to each user group. The assignment may proceed according to one of three built-in allocation techniques. Program users may also specify allocations for individual budget items as input prior to program execution. A brief review of each technique available to the user is given below.

2.1.1 External Allocation

Whereas most of the actual allocations are presumed to be computed by the program package, external allocation allows the user to make allocations prior to program execution. This may be done in one of two ways.

First, a portion of the costs in any of the cost categories may be allocated to any of the four user groups prior to execution. In the cost allocation study, often prior fractional allocations were made only to the general public; for this reason, the program contains the flexibility to allow prior fractional allocations either to the public interest exclusively, or to all four user groups. In this case, the user also must specify which of the built-in allocation techniques is to be used to allocate those costs not allocated externally.

Second, entire cost categories may be allocated to the general public by external analysis but may be included in the cost base, using this "allocation method", for completeness.

2.1.2 Built-in Internal Allocation Techniques

There are three built-in allocation techniques available to the program user: engineering estimates, modified long run marginal cost, and proportional to grants-in-aid. Each method is described briefly below. Detailed development of each method, appears in Reference 1 .

In the engineering estimates method, percentage shares for each user category are multiplied by the total cost, as given in the cost base. The resulting products are the allocations to each user group. The percentages must sum to 1.0 to insure that all costs are allocated.

In the modified long run marginal cost method, the long run marginal cost of providing a specific service is multiplied by the number of times such a service is performed to estimate the variable cost associated with serving a type of user. The sum of the variable cost for each user group gives the total variable cost. The total "residual" cost--the difference between the total variable cost and the total cost as given in the cost base--is allocated among users based on the inverse proportions of the user's elasticity of demand with respect to price. The allocation to each user group is the sum of that group's variable and residual cost.

The "proportional to grants-in-aid" method allocates costs among the four user groups in identical percentages as those used for grants-in-aid costs. Projected grants-in-aid costs are divided into three categories and allocated as follows: funds for air carrier and reliever airports (allocated to airlines), funds for general aviation airports (allocated to general aviation), and funds for planning grants (allocated to airlines and general aviation in proportion to funds for airports). No costs are allocated to the military in this method.

2.1.3 Additional Allocation Techniques

There is no provision in the program for additional allocation techniques supplied by the user. Hence, changes to the software are necessary if the user requires another allocation technique. For example, in the cost allocation study, special consideration was necessary in the handling of the operations and maintenance costs incurred by the Flight Service Stations (FSS). This was accomplished by modification of the allocation module prior to execution. The program listings in Appendix A include those modifications.

2.2 Modification

Modification may be used to perform sensitivity analysis. Once a particular case has been processed, the program user may wish to see how the results change if values of certain parameters are varied. The modification logic allows the program user to make those changes during actual program execution and run the modified data base without setting up another data base in the input file. Any particular case may be modified as many times as the user desires.

3. PROGRAM LOGIC AND MODULES

3.1 Introduction

The program package consists of one main program and six subroutines. The logic of the program package is embodied in the main program which calls one subroutine for execution of each of the six tasks mentioned in Section 2. The names, mnemonics and functions of each of the six program subroutines are summarized in Table 3-1. Program listings for the main program and each of the subroutines are contained in Appendix A.

The program logic is summarized by the flow chart for the main program which is shown in Figure 3-1. This flow chart is read by starting at the top and reading downward. Rectangular boxes include program commands and pentagonal boxes include control statements. When a control statement is encountered, logic flow shifts to the right. When a branch of the flow chart has been followed to the end, flow then reverts to the point just following the location where the terminated branch was entered.

3.2 User Interaction in the Main Program

Successful execution of the main program requires a computer system equipped with output devices which allow the user to enter responses to program generated questions. To a large extent, the response of the user to these questions determines the flow of the main program. The logic of the main program, including program generated questions requiring user responses, is summarized below.

Execution begins with the INITIAL module in which data common to all cases is read. The exact data inputs and their appropriate formats are described in Section 4. After the execution of the INITIAL module, the program reads a value of CASENAM (a character variable name of the particular case to be analyzed) and then begins looping through the rest of the modules. At the end of each execution of the loop, a new value for CASENAM is read; execution terminates when a blank is read into CASENAM.

If CASENAM is not blank, then execution continues with the INPUT module. This routine reads the cost base and allocation instructions for the current case and prints the value of CASENAM on the output device. After the INPUT module is executed, the program user must decide if this case should be processed by answering the following question which the program prints on the output device.

DO YOU WANT TO RUN THIS CASE?

TABLE 3-1

DESCRIPTION OF THE INPUT MODULES

MODULE NAME	MODULE MNEMONIC	MODULE FUNCTION
Initialization	INITIAL	Read data which does not vary from case to case
Input	INPUT	Read cost base and related data for each case
Allocation	ALLOCAT	Perform appropriate allocation procedure on each cost category
Print Input	PRINPUT	Print tables of input data for verification
Output	PRINT	Print allocation tables, one for each year
Modification	MODIFY	Modify cost base and parameters at user's discretion in preparation for re-tun of same case

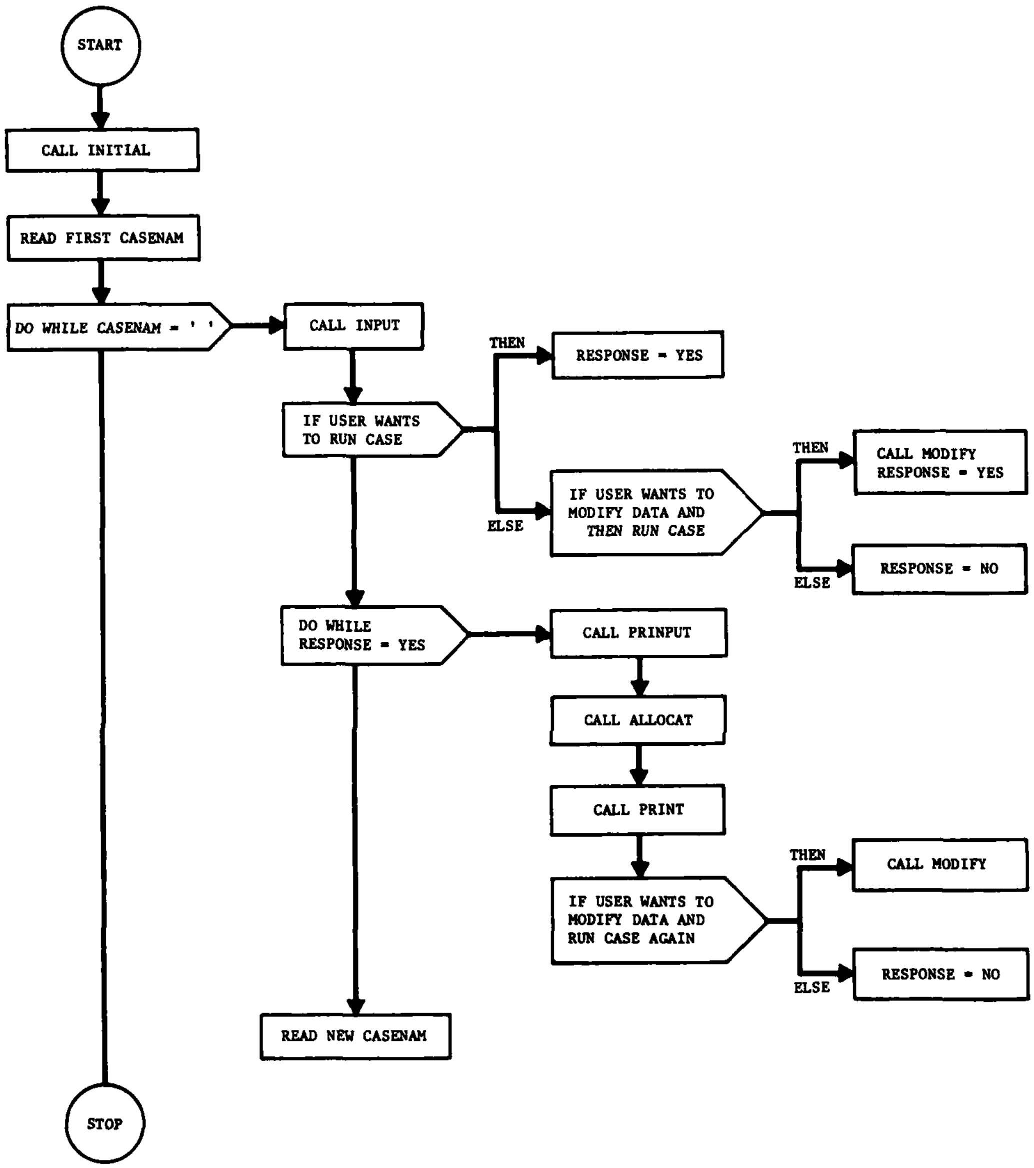

FIGURE 3-1
MAIN PROGRAM LOGIC

An answer of YES or NO is required and execution continues only after the user enters one of these answers. If the user answers positively, a variable called RESPONSE is set to YES. Otherwise, the program asks another question which gives the user the option of modifying the current case data before processing:

DO YOU WANT TO MODIFY THE DATA AND THEN RUN?

If the user answers positively to this question, RESPONSE is set to YES and the MODIFY module is executed. Otherwise, RESPONSE is set to NO.

The value of the RESPONSE variable is used to determine the direction of flow in further processing. If RESPONSE is NO, thereby indicating that the user has requested no further processing of this data base, a new value for CASENAM is read and flow returns to the top of the outer processing loop.

If RESPONSE is YES, then execution proceeds through the PRINPUT, ALLOCAT and PRINT modules. Once the output has been printed, user interaction is again required. This time, the user must decide if further processing of the same data base is desired; the following question appears on the output device:

DO YOU WANT TO MODIFY THE DATA AND RUN THIS CASE AGAIN?

A positive response leaves the RESPONSE variable set to YES, calls the MODIFY module and flow reverts to the top of the inner processing loop. Then the PRINPUT, ALLOCAT, AND PRINT modules are called again. A negative response resets the RESPONSE variable to NO. In this case, flow drops out of the inner processing loop, a new value for CASENAM is read, and flow returns to the top of the outer processing loop.

3.3 Error Messages

There are no error messages generated by the program package which will cause termination of the run. However, if the user answers one of the program-generated questions with a response other than YES or NO, the program will respond:

PLEASE ANSWER YES OR NO

Another prompt will be issued and the user will be asked to answer the same question that had just been answered incorrectly. This message is part of a loop which will continue to be executed until either YES or NO has been entered by the user.

4. PROGRAM INPUT

4.1 Requirements

The input requirements for the allocation program package are summarized in Table 4-1. The variables may be divided into two categories: those unique to a particular run and those unique to a particular case. A run is one complete execution of the program. A case is one cost base to be allocated among the four user groups. Each run may include several cases.

4.1.1 Inputs Unique to a Run

The first three input requirements listed in Table 4-1 remain constant for all cases in a particular run. These are read in the INITIAL module. For cases in which different values of these inputs are required, it would be necessary to make additional runs.

The deflators are figures used to convert constant dollars to current dollars. For historical analyses, these numbers can be found in the Economic Report of the President. For forecasting, which was the case in the cost allocation study, these values must be forecast as well. The program has a capacity of three sets of deflators; in the case of the cost allocation study, government purchases of goods and services, structures, and producers durable equipment were used.

Elasticities of demand report the percentage change in demand for each 1% increase in price. In the case of the cost allocation study, the demand for Air Traffic Control (ATC) services was used.

Activity statistics are used in conjunction with the modified long run marginal cost method for allocation. The program has a capacity of five sets of activity statistics, each of which must contain values for each of the four user groups in each year. Aviation activity statistics such as number of aircraft contacts made by Flight Service Stations (FSS) and number of flight plans filed were required in the cost allocation study.

4.1.2 Data Unique to Each Case

The remaining variables in Table 4-1 are unique to each case being analyzed. These inputs are read in the INPUT module.

Each cost category must have a name. The program allows names to be specified in "outline form" using up to three levels of detail, each level of which may be a maximum of 10 characters. This form is illustrated by the listing of the cost categories

TABLE 4-1

INPUT VARIABLES

VARIABLE NAME	VARIABLE MNEMONIC	VARIABLE DESCRIPTION
Deflators	DEFLATE	Used to convert constant dollars to current dollars and vice versa
Elasticities of demand	E	Percentage change in demand for ATC services for each increase of 1% in price
Activity Statistics	ACTIVITY	Demands for various ATC services, depending on cost categories
Cost Category Names	DESCRIP	Names of the cost categories
Allocation Technique	TYPCOST	Abbreviation for allocation technique to be used for each cost category
Duplication	CSTLIKE	Number of cost category using the same parameters for the same allocation technique
Deflator Type	DFLTR	Number for deflator type to be used with this cost category
Activity Number	ACTNUM	Number of set of activity statistics to be used with a particular cost category
Allocation Data	ALLDATA	Parameters required by the allocation technique chosen for a particular cost category
Cost Base	GROSS	Costs to be allocated in a particular cost category
Allocations	ALLO	Dollar amount allocated to a particular user group in a particular cost category

used in the cost allocation study which is shown in Table 4-2. In each case, only the levels of detail which make a category unique must be specified. For example, only one level of detail is used to distinguish R&D costs whereas three levels are required for the O&M costs.

To insure appropriate output format, all cost categories having the same first level name must be grouped together. Within each first level category, all costs having the same second level name must be grouped together. This is illustrated in Table 4-2 by the O&M costs; there are seven categories and all are grouped together. Furthermore, within the O&M costs, all O&M CENTERS costs are grouped together as are O&M TOWERS costs and O&M OTHER costs. If such costs were not grouped together, the program would process the costs and print the correct results, but the output routine would be unable to group all the O&M costs together.

The third level of cost detail is provided only for the benefit of the user and is not used in the processing. All costs with the same first and second level names are added together prior to processing but after the input has been printed. Thus, the third level of detail will be included in the input data tables but not in the output data tables.

The allocation technique to be used for each cost category is read into TYPCOST. For brevity, abbreviations are used as shown in Table 4-3.

The CSTLIKE variable indicates where the program can find parameters for the allocation technique chosen for each cost category. It allows the user to list one set of parameters for a specific allocation technique for the first occurrence only. In these cases, CSTLIKE should be set to '0' and allocation parameters should be read into the ALLDATA variable, described below. When exactly the same technique with exactly the same parameters is used again, the CSTLIKE variable should be set equal to the number of the cost category which first uses the same allocation technique and parameters. Cost categories are assumed to be numbered consecutively in the order in which they are input.

As mentioned in Section 4.1.1, the program has a capacity of three sets of deflators. In addition, as many as two additional sets of deflators may be generated by using a linear combination of the three input sets. When there are five deflators, deflator 1 is the first deflator in the input list, deflator 2 is the second and deflator 3 is the third. Deflator 4 is the first hybrid deflator (formed by a linear combination of two of the input

TABLE 4-2

COST ALLOCATION COST CATEGORIES

R&D			RESEARCH AND DEVELOPMENT
F&E	CENTERS		FACILITIES AND EQUIPMENT
F&E	TOWERS		FACILITIES AND EQUIPMENT
F&E	FSS		FACILITIES AND EQUIPMENT
F&E	NAVAIDS		FACILITIES AND EQUIPMENT
F&E	OTHER		FACILITIES AND EQUIPMENT
O&M	CENTERS	OPS	OPERATIONS AND MAINTENANCE
O&M	CENTERS	MAINT	OPERATIONS AND MAINTENANCE
O&M	TOWERS	OPS	OPERATIONS AND MAINTENANCE
O&M	TOWERS	MAINT	OPERATIONS AND MAINTENANCE
O&M	FSS		OPERATIONS AND MAINTENANCE
O&M	OTHER	OPS	OPERATIONS AND MAINTENANCE
O&M	OTHER	MAINT	OPERATIONS AND MAINTENANCE
SUPPORT	I&M		INSTALLATION AND MATERIEL
SUPPORT	ADM F ST		ADMINISTRATIVE FLIGHT STANDARDS
SUPPORT	ADM MED		ADMINISTRATIVE MEDICINE
SUPPORT	DEV DIR		DEVELOPMENT DIRECTION
SUPPORT	A-P ADM		AIRPORT ADMINISTRATION
SUPPORT	CENT TRN		CENTRALIZED TRAINING
SUPPORT	DIR, S&S		DIRECTION, STAFF AND SUPPORT
FE&D			FACILITIES, ENGINEERING AND DEVELOPMENT
NAT CAP AP			NATIONAL CAPITAL AIRPORTS
GRANTS			GRANTS-IN-AID

TABLE 4-3

ALLOCATION METHOD ABBREVIATIONS

E	Engineering Estimates
M	Modified Long Run Marginal Cost
P	Public Interest Exclusively
G	Grants-in-Aid
MA	Based on Total O&M Allocation

deflators) and deflator 5 is the second hybrid deflator. If there are fewer than five deflators, the indices are contracted accordingly so that only consecutive integers are used. The variable DFLTR is set equal to the index corresponding to the appropriate set of deflators to be used for each category.

The activity statistics sets operate in a fashion similar to that of the deflators. There is an allowance in the program for a maximum of five sets of activity statistics which are used in conjunction with the long run marginal cost allocation method. Each set is accessed by a number, 1 being the first set read in and 5 being the last one. Those cost categories which use the long run marginal cost allocation method require the variable ACTNUM to be set equal to the appropriate activity set index. In other cases, ACTNUM may be left blank.

Allocation parameters are read into ALLDATA. They are only needed for cost categories whose CSTLIKE variable '0'; otherwise, they may be left blank. If the cost category uses engineering estimates for allocation, then the allocation parameters are the percentages of the total cost which are allocated to each of the user groups. If the cost category uses modified long run marginal cost for allocation, then the allocation parameters are the cost coefficients for each of the user groups. No allocation parameters are required for the grants-in-aid method.

The cost base is the set of costs which are to be allocated. For each category, one cost must be entered for each year in the analysis. If any allocations in a particular cost category have been made prior to execution, these are entered following the cost base, one entry for each year. Prior allocations may be made solely for costs incurred in the public interest or for all allocation types. In the former case, only one additional row of numbers is required in addition to the cost base; in the latter case, four additional rows are required, even if some rows are completely comprised of zeros. Section 4.2 shows how these rows are accessed by the program.

4.2 Data Formats for Program Input

This section deals with the formats of the input data required to run the allocation program package. Two files are required. The environment file (ENVDATA) contains values which are unique to each run. The cost file (CSTDATA) contains values which are unique to each case. Data for as many as ten years may be entered in the ENVDATA and CSTDATA files. However, the number of years of data entered in the CSTDATA file may not exceed the number of years of data in the ENVDATA file under which the CSTDATA file will be run.

4.2.1 The Environment File (ENVDATA)

The ENVDATA file includes all data unique to each run. A sample ENVDATA input listing, which was actually used in the cost allocation study, is found in Table 4-4.

The first items required are the deflators. Each deflator entry consists of two lines: the name of the deflator set, up to a maximum of ten characters, occupies the first line; the deflators themselves, in seven character fields separated by blanks, occupy the second line. The program has accommodation for up to three different sets of deflators; one deflator in each set must be entered for each year in the analysis. Next, up to two sets of ratios may be added which define new deflators as linear combinations of the first three. Each set of ratios also contains two lines with the name in the first and data in the second. As shown in Table 4-4, the hybrid deflators must be given names LIN COMB 1 and, when used, LIN COMB 2. The data here consist of three entries, each being the percentage of the first, second and third deflators, respectively, which comprise the hybrid deflator.

The activity statistics to be used in conjunction with the long run marginal cost allocation method are input next. They are formatted in several rows similar to the deflators: a 25-character name on the first line is followed by data in seven character fields on subsequent lines. The program has accommodation for up to five sets of activity statistics and the data may be input in one of two ways: directly, or using ratios. In the direct method, each set of statistics contains one entry for each year in the analysis for each of the four user groups. In the ratio method, each set of data consists of four percentages and one time-series of data; a time-series for each user group is derived by multiplying the appropriate percentage by the time-series. The program differentiates between the two cases by checking column 26 on the name line. An asterisk (*) is used to denote statistics using the ratio method while a blank is used otherwise.

Next, four elasticities of demand are read. These are the elasticities of demand for each of the user groups with respect to price. If any user group should not be allocated a portion of the residual costs when using the modified long run marginal cost technique, an elasticity of demand equal to zero should be input.

The three additional statistics required are peculiar to the cost allocation study; these are the operations subtracted from

TABLE 4-4

ENVDATA FILE INPUT SAMPLE

```
1977 1986
STRUCTURES
  1.062   1.136   1.217   1.303   1.385   1.458   1.528   1.596   1.686   1.769
EQUIPMENT
  1.061   1.096   1.162   1.213   1.268   1.319   1.366   1.413   1.476   1.550
GOVT
  1.078   1.144   1.209   1.277   1.351   1.426   1.503   1.584   1.674   1.763
LIN COMB 1
  0.845   0.155   0.
LIN COMB 2
  0.485   0.515   0.
IFR AIRCRAFT HANDLED
 13.1    13.4    13.7    14.0    14.5    15.0    15.3    15.6    16.1    16.7
  4.0     3.9     3.9     3.9     3.9     3.9     3.9     3.9     3.9     3.9
  8.6     9.5    10.2    11.1    12.4    13.3    13.8    14.5    15.1    15.8
  0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
AIRCRAFT OPS: TOWERS
  9.7     9.9    10.2    10.5    10.9    11.1    11.4    11.7    12.1    12.5
  2.4     2.4     2.4     2.4     2.4     2.4     2.4     2.4     2.4     2.4
 54.5    57.5    60.2    63.9    68.1    73.0    76.5    79.6    82.6    85.3
  0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
PILOT CONTACTS: FSS
  0.4     0.4     0.4     0.4     0.4     0.4     0.4     0.4     0.4     0.4
  0.6     0.6     0.6     0.6     0.6     0.6     0.6     0.6     0.6     0.6
  9.4    10.1    10.9    11.1    11.5    11.9    12.1    12.5    12.9    13.2
  0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
PILOT BRIEFS          *
  0.0395  0.0904  0.8701  0.
 18.6    19.9    20.5    21.2    23.2    25.6    28.6    31.3    32.6    33.3
FLIGHT PLANS          *
  0.1136  0.2159  0.6705  0.
  8.8     9.3     9.7    10.1    10.7    11.5    12.5    13.6    14.3    14.7
  1       1       2       0
  0.268   0.270   3.642
```

the tower statistics to account for service to small communities. When not appropriate, these statistics should be set to zero.

4.2.2 The Cost Base Data File (CSTDATA)

The CSTDATA file consists of blocks of data unique to each case. As mentioned in Section 3.2, it is not always necessary to process each case for which there is data in CSTDATA. The final line in CSTDATA should be blank; this serves as notice to the program that execution should be terminated. A sample CSTDATA input listing, which was actually used in the cost allocation study, is found in Table 4-5.

Each block of data represents one case to be analyzed. There may be as many cases in CSTDATA as the user requires; however, the data in the corresponding ENVDATA file must be applicable to each case. Each case begins with a single case header line. Within each case, each cost category begins with a cost category header line.

The format of the case header line is shown in Table 4-6. The name of the case should be centered in Columns 1-12. The years during which the analysis is being performed are defined by specifying the first year of the analysis in Columns 14-17 and the last year of the analysis in Columns 19-22; the duration of the study may not exceed ten years. The final four fields are designations for the output tables printed by the program and may be used at the discretion of the user. The first two designations specify table designations for the tables which report the cost base in constant dollars and in current dollars. The final two designations specify titles for the two tables which report the allocations, first in constant dollars and then in current dollars. Any three-character designation is acceptable in either case.

Following the case header line, data is reported for each cost category. Each cost category data set consists of one header line and between one and five lines of cost data.

The format of the cost category header line is shown in Table 4-7. The first three ten-character fields are for specifying the name of the cost category. Details of this format were described in Section 4.1.2. An example of cost categories was shown in Table 4-2. Specification of the name of the cost category is followed in columns 32-33 by the abbreviation for the allocation methodology to be used for this category; the abbreviations to be used were summarized in Table 4-3. This is followed in columns 34-35 by a value for the CSTLIKE variable. As mentioned

TABLE 4-5

CSTDATA FILE INPUT SAMPLE

```
 BASELINE   2-1 2-2 F-1 F-2        A.C.  MIL/GOVT      G.A.    PUBLIC
R&D                            E  0        3P       .64     .11     .25     0
 69.597  74.3    74.3    74.3    74.3    74.3    74.3    74.3    74.3    74.3
  1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5
F&E      CENTERS               E  0        4        .72     .18     .10     0
 43.763  54.398  65.226  97.735  75.934  43.36   54.171  59.55   70.327  75.679
F&E      TOWERS                E  0        5P       .54     .13     .33     0
 78.435  67.655  80.644  90.045  94.245  79.497  75.343  76.242  73.865  75.388
  1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5
F&E      FSS                   E  0        2        .05     .00     .95     0
 15.429  9.      37.867  40.396  42.587  43.973  36.603  41.074  33.875  19.355
F&E      NAVAIDS               E  0        2        .54     .13     .33     0
 33.865  44.3    63.8    51.5    52.3    47.2    45.5    43.9    42.3    40.9
F&E      OTHER                 E  0        2        .67     .00     .33     0
 16.945  27.45   27.45   27.45   27.45   27.45   27.45   27.45   27.45   27.45
O&M      CENTERS   OPS         M  0        3P1     13.83   17.60    9.96    0
292.982 297.319 299.147 302.651 321.039 335.346 343.486 353.689 364.9   378.13
O&M      CENTERS   MAINT
181.905 190.702 197.667 206.008 218.534 228.251 233.812 240.749 248.374 257.374
 51.7    52.3    51.2    51.2    51.9    54.0    55.3    55.2    56.4    57.5
O&M      TOWERS    OPS         M  0        3P2     10.04    6.47    1.88    0
284.574 290.783 300.047 311.864 325.408 339.583 350.379 360.081 369.807 378.828
O&M      TOWERS    MAINT
158.401 150.142 155.416 162.152 169.92  178.032 184.195 189.727 195.231 200.361
 37.9    38.1    39.2    39.6    39.6    39.7    39.9    40.4    40.7    40.8
O&M      FSS                  MM  0        3P3      1.72    1.51    1.12    0
107.182 107.175 107.175 105.031 102.898 100.744  98.601  96.457  94.314  92.17
  3.6     3.6     3.6     3.6     3.6     3.6     3.6     3.6     3.6     3.6
O&M      OTHER     OPS        MA  0        3P
 37.47   38.156  38.156  38.156  38.156  38.156  38.156  38.156  38.156  38.156
O&M      OTHER     MAINT
 25.053  25.563  26.486  27.603  29.123  30.47   31.358  32.276  33.279  34.339
  6.2     6.2     6.2     6.2     6.2     6.2     6.2     6.2     6.2     6.2
```

TABLE 4-5

CSTDATA FILE INPUT SAMPLE (CONTD)

```
SUPPORT   I&M                     M 10      3P
136.06  144.285 147.027 150.903 158.657 165.653 170.286 175.203 180.309 185.793
 36.1    37.1    38.3    39.3    40.1    41.6    43.2    44.8    46.4    47.9
SUPPORT   ADM F ST                P  0      3
142.327 150.672 154.744 158.643 163.38  168.521 173.113 176.781 181.69  186.6
SUPPORT   ADM MED                 P  0      3
  8.539   9.074   9.312   9.521   9.848  10.473  10.889  11.157  11.514  11.931
SUPPORT   DEV DIR                 E  1      3
  6.677   7.587   7.587   7.587   7.587   7.587   7.587   7.587   7.587   7.587
SUPPORT   A-P ADM                 G 20      3P
 18.897  23.559  24.135  24.711  25.04   25.534  26.     26.576  27.152  27.645
  2.0     2.0     2.0     2.0     2.0     2.0     2.0     2.0     2.0     2.0
SUPPORT   CENT TRN                M 10      3*
 71.602  81.283  82.873  85.041  88.725  91.977  94.144  96.456  98.841 101.37
  1.0     1.0     1.0     1.0     1.0     1.0     1.0     1.0     1.0     1.0
  0       0       0       0       0       0       0       0       0       0
  0.2     0.2     0.2     0.2     0.2     0.2     0.2     0.2     0.2     0.2
 25.1    25.1    25.1    25.1    25.1    25.1    25.1    25.1    25.1    25.1
SUPPORT   DIR, S&S                M 10      3*
140.77  146.291 148.588 151.638 156.955 161.648 164.776 168.1   171.54  175.255
 16.8    16.8    16.8    16.8    16.8    16.8    16.8    16.8    16.8    16.8
  1.6     1.6     1.6     1.6     1.6     1.6     1.6     1.6     1.6     1.6
  4.9     4.9     4.9     4.9     4.9     4.9     4.9     4.9     4.9     4.9
 30.2    30.2    30.2    30.2    30.2    30.2    30.2    30.2    30.2    30.2
FE&D                              P  0      3
 20.347  20.347  20.347  20.347  20.347  20.347  20.347  20.347  20.347  20.347
NTL CAP AP                        P  C      3
 28.393  28.393  28.393  28.393  28.393  28.393  28.393  28.393  28.393  28.393
```

TABLE 4-5

CSTDATA FILE INPUT SAMPLE (CONTD)

```
GRANTS                                 G  0        1*
521.3   555.    590.    625.    645.    675.    705.    740.    775.    805.
440.0   465.0   495.0   525.0   540.0   565.0   590.0   620.0   650.0   675.0
 11.3    15.0    15.0    15.0    15.0    15.0    15.0    15.0    15.0    15.0
 70.0    75.0    80.0    85.0    90.0    95.0   100.0   105.0   110.0   115.0
  0       0       0       0       0       0       0       0       0       0
 ALTERNATIVE 2-3 2-4 F-3 F-4        A.C.  MIL/GOVT       G.A.     PUBLIC
R&D                                    E  0        3P       .64     .11     .25     0
 69.597  74.3    74.3    74.3    74.3    74.3    74.3    74.3    74.3    74.3
  1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5
F&E        CENTERS                     E  0        4        .72     .18     .10     0
 43.763  55.     49.     39.     42.     43.     37.     61.     103.    116.
F&E        TOWERS                      E  C        5P       .54     .13     .33     0
 78.435  76.     107.    104.    107.    133.    149.    122.    117.    115.
  1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5     1.5
F&E        FSS                         E  0        2        .05     .00     .95     0
 15.429  43.     49.     55.     63.     57.     39.     32.     17.     17.
F&E        NAVAIDS                     E  0        2        .54     .13     .33     0
 33.865  50.     73.     94.     89.     71.     80.     90.     86.     62.
F&E        OTHER                       E  0        2        .67     .00     .33     0
 16.945  26.     28.     25.     27.     29.     32.     38.     31.     35.
O&M        CENTERS    OPS              M  0        3P1     13.83   17.60    9.96    0
292.982 297.319 299.147 302.651 300.036 294.15  283.885 276.308 244.883 230.557
O&M        CENTERS    MAINT
181.905 190.702 197.667 206.008 218.534 228.251 233.612 240.749 248.374 257.374
 51.7    52.3    51.2    51.2    51.9    54.0    55.3    55.2    56.4    57.5
O&M        TOWERS     OPS              M  0        3P2     10.04    6.47    1.88    0
284.574 290.783 300.047 311.864 315.971 320.227 321.298 321.552 316.185 315.563
O&M        TOWERS     MAINT
158.401 150.142 155.416 162.152 169.92  178.032 184.195 189.727 195.231 200.361
 37.9    38.1    39.2    39.6    39.6    39.7    39.9    40.4    40.7    40.8
```

TABLE 4-5

CSTDATA FILE INPUT SAMPLE (CONTD)

O&M	FSS			MM 0	3P3	1.72	1.51	1.12	0
107.182	107.175	107.175	105.031	102.888	100.744	98.601	96.457	94.314	92.17
3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
O&M	OTHER	OPS		MA 0	3P				
37.47	38.156	38.156	38.156	35.656	33.056	30.556	30.556	30.556	30.556
O&M	OTHER	MAINT							
25.053	25.568	26.486	27.603	25.323	22.87	19.958	20.876	21.879	22.939
6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
SUPPORT	I&M			M 10	3P				
136.06	144.285	147.027	150.903	151.282	150.998	148.823	147.027	138.234	134.641
36.1	37.1	38.3	39.3	40.1	41.6	43.2	44.8	46.4	47.9
SUPPORT	ADM F ST			P 0	3				
142.327	150.672	154.744	158.643	163.38	168.521	173.113	176.781	181.69	186.6
SUPPORT	ADM MED			P 0	3				
8.539	9.074	9.312	9.521	9.848	10.473	10.889	11.157	11.514	11.931
SUPPORT	DEV DIR			R 1	3				
6.677	7.587	7.587	7.587	7.587	7.587	7.587	7.587	7.587	7.587
SUPPORT	A-P ADM			G 20	3P				
18.897	23.559	24.135	24.711	25.04	25.534	26.	26.576	27.152	27.645
2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SUPPORT	CENT TRN			M 10	3*				
71.602	81.283	82.873	85.041	86.486	87.497	87.642	87.931	86.124	85.908
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0	0	0	0	0	0	0	0	0	0
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
SUPPORT	DIR, S&S			M 10	3*				
140.77	146.281	148.588	151.638	153.554	154.961	154.961	155.235	152.341	151.95
16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2

TABLE 4-5

CSTDATA FILE INPUT SAMPLE (CONCLUDED)

```
FE&D                                        P   0        3
 20.347  20.347  20.347  20.347  20.347  20.347  20.347  20.347  20.347  20.347
NTL CAP AP                                  P   C        3
 28.393  28.393  28.393  28.393  28.393  28.393  28.393  28.393  28.393  28.393
GRANTS                                      G   0        1*
521.3   555.    590.    625.    645.    675.    705.    740.    775.    805.
440.0   465.0   495.0   525.0   540.0   565.0   590.0   620.0   650.0   675.0
 11.3    15.0    15.0    15.0    15.0    15.0    15.0    15.0    15.0    15.0
 70.0    75.0    80.0    85.0    90.0    95.0   100.0   105.0   110.0   115.0
  0       0       0       0       0       0       0       0       0       0
```

TABLE 4-6

CASE HEADER LINE FORMAT

Columns 1-12	Name of case (Centered)
Column 13	Blank
Columns 14-17	First year of analysis
Column 18	Blank
Columns 19-22	Last year of analysis
Column 23	Blank
Columns 24-26	Table designation for input Table 1
Column 27	Blank
Columns 28-30	Table designation for input Table 2
Column 31	Blank
Columns 32-34	Table designation for output Table 1
Column 35	Blank
Columns 36-38	Table designation for output Table 2

EXAMPLE:

```
        10        20        30    <---   COLUMN NUMBERS
         ↓         ↓         ↓
 ALTERNATIVE 1977 1986 2-2 2-3 A-1 A-2
```

TABLE 4-7

COST CATEGORY HEADER LINE FORMAT

Columns 1-10	Primary Level Cost Category Name
Columns 11-20	Secondary Level Cost Category Name
Columns 21-30	Tertiary Level Cost Category Name
Column 31	Blank
Columns 32-33	Abbreviation for Allocation Methodology (Left Justified)
Columns 34-35	CSTLIKE (Right Justified)
Columns 36-41	Blank
Columns 42-43	Number of deflator to be used (Right Justified)
Column 44	'P' if prior costs allocated to public sector '*' if prior costs allocated to all user groups ' ' otherwise
Column 45	Number of activity series to be used (Right Justified)
Columns 46-48	Blank
Columns 49-55	Allocation data field 1
Column 56	Blank
Columns 57-63	Allocation data field 2
Column 64	Blank
Columns 65-71	Allocation data field 3
Column 72	Blank
Columns 73-79	Allocation data field 4
Column 80	Blank

EXAMPLE:

```
         1 0       2 0       3 0       4 0       5 0       6 0       7 0     COLUMN NUMBERS
O&M         TOWERS    OPS          M O       3P2   10.04     6.47    1.88     0
```

in Section 4.1.2, in cases where allocation is exactly the same as that used in a previous line, CSTLIKE is the number of that previous line; otherwise, CSTLIKE is zero. This is followed in columns 42-43 by the number of the deflator set which should be applied to this cost category; this variable may not exceed 5 and its value corresponds to the order in which the deflators were read. After the deflator indicator, a one character flag field in column 44 is used to report whether the cost category contains data concerning allocations of costs made prior to execution. A 'P' in this field indicates that allocations have been made for the public interest only and that these costs immediately follow the cost base. An '*' in this field indicates that allocations have been made for all user groups and that these follow the cost base. A blank in this field indicates that there is only information for the cost base itself in this category and that no prior allocations have been made. This is followed in column 45 by the number of the appropriate set of activity series data to be used; this is blank in all cases except categories using the modified long run marginal cost allocation method whose CSTLIKE variable is 0. The final four fields are reserved for allocation parameters. These are also blank except for those cases where CSTLIKE = 0. In those cases, the four allocation parameters are percentages for categories which use engineering estimates, and they are cost coefficients for categories which use modified long run marginal cost. They are blank for cases which use grants-in-aid allocation.

After the header line, the cost base is entered; data should be in constant dollars and any appropriate dollar denomination (thousands, millions, etc.) is acceptable except that it must be constant through the input file. One entry for each cost category for each year in the analysis is required. Then, depending on the cost category header information, allocations made prior to execution are entered; similarly, one entry for each allocation for each year in the analysis must be reported. If prior allocations have been made for all users, they are entered in the following order: air carriers, military, general aviation and public interest.

5. MODIFICATION

The MODIFY module is equipped to handle modifications of three items: costs, prior allocations and allocation parameters. The same logic applies to each case.

The MODIFY module is entered if the user has requested modification of the existing data base. The main code of the MODIFY module is executed three times, once in response to each of the following questions:

ARE YOU CHANGING ANY COSTS?

ARE YOU CHANGING ANY PRIOR ALLOCATIONS?

ARE YOU CHANGING ANY ALLOCATION PARAMETERS?

If the user answers negatively to any one of the questions, flow moves on to the next question; a negative answer to the final question results in flow transferring back to the main program.

If the user answers positively to any one of the questions, the MODIFY module commences prompting the user with a series of questions designed to determine the exact value the user wishes to change. For prior allocations and allocation parameters, the program prints the following question:

WHICH USER GROUP IS BEING CHANGED?

Then, the program prints a table of choices and their numeric equivalents and then prompts the user for an answer. For costs and prior allocations, the program then prints the following question:

WHICH YEAR IS BEING CHANGED?

The user responds by entering the four digit year that is being altered. Finally, in all cases, the program prints this question:

ENTER COST CATEGORY TO BE CHANGED

As with the first question, the program prints a table of choices and their numeric equivalents and then prompts the user for an answer.

Once these questions have been answered, one explicit data item has been identified. The program requests the new value from the

user by printing the following statement:

ENTER NEW VALUE FOR THIS ITEM

After receiving the prompt from the computer, the user enters the new value for the data item that was defined above.

Once a correction has been made, the program asks the user whether there are more corrections of the particular data type currently under consideration by asking one of the following three questions, whichever is appropriate:

ARE YOU CHANGING ANY MORE COSTS:

ARE YOU CHANGING ANY MORE PRIOR ALLOCATIONS?

ARE YOU CHANGING ANY MORE ALLOCATION PARAMETERS?

A negative answer will cause the program to revert to the top of the MODIFY module and begin the entire procedure again for the next data type. If all three types have been considered, flow reverts to the main program. A positive answer transfers flow to the point in the MODIFY module where a specific description of the data type to be changed is required.

6. OUTPUT SAMPLES

As explained in Section 4.2.2, there are two output types which are generated by the allocation program package. These include a summary of the input values and a summary of the allocations. Samples of these two output types appear in Table 6-1 for the input data, and in Table 6-2 for the allocations, both of which were used in the cost allocation study. The ENVDATA file data is printed once for each run, the CSTDATA file is printed once for each case, and the allocation tables are printed for each case and each modification. While the cost allocation study included tables in both constant and current dollars, only the tables in constant dollars have been included here; the tables in current dollars have an identical appearance.

TABLE 6-1

SAMPLE OF PRINTED INPUT VALUES

DEFLATORS

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
STRUCTURES	1.062	1.136	1.217	1.303	1.385	1.458	1.528	1.596	1.686	1.769
EQUIPMENT	1.061	1.096	1.162	1.213	1.268	1.319	1.366	1.413	1.476	1.550
GOVT	1.078	1.144	1.209	1.277	1.351	1.426	1.503	1.584	1.674	1.763
LIN COMB 1	1.062	1.130	1.208	1.289	1.367	1.436	1.503	1.568	1.653	1.735
LIN COMB 2	1.061	1.115	1.189	1.257	1.325	1.386	1.445	1.502	1.578	1.656

ACTIVITY STATISTICS

IFR AIRCRAFT HANDLED	13.100	13.400	13.700	14.000	14.500	15.000	15.300	15.600	16.100	16.700
	4.000	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900
	8.600	9.500	10.200	11.100	12.400	13.300	13.800	14.500	15.100	15.800
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AIRCRAFT OPS: TOWERS	9.700	9.900	10.200	10.500	10.900	11.100	11.400	11.700	12.100	12.500
	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400
	54.500	57.500	60.200	63.900	68.100	73.000	76.500	79.600	82.600	85.300
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PILOT CONTACTS: FSS	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
	9.400	10.100	10.900	11.100	11.500	11.900	12.100	12.500	12.900	13.200
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PILOT BRIEFS	0.725	0.776	0.799	0.827	0.905	0.998	1.115	1.221	1.271	1.299
	1.674	1.791	1.845	1.908	2.088	2.304	2.574	2.817	2.934	2.997
	16.182	17.313	17.835	18.444	20.184	22.272	24.882	27.231	28.362	28.971
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLIGHT PLANS	0.994	1.051	1.096	1.141	1.209	1.299	1.412	1.537	1.616	1.661
	1.892	1.999	2.085	2.171	2.300	2.472	2.687	2.924	3.074	3.160
	5.896	6.231	6.499	6.767	7.169	7.705	8.375	9.112	9.581	9.849
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

TABLE 6-1

SAMPLE OF PRINTED INPUT VALUES (CONTD)

TABLE 2-2

BASELINE TOTAL COSTS
FY76 CONSTANT DOLLARS (MILLIONS)

			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
R&D			69.6	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
P&E	CENTERS		43.8	54.4	65.2	97.7	75.9	43.4	54.2	59.5	70.3	75.7
	TOWERS		78.4	67.7	80.6	90.0	94.2	79.5	75.3	76.2	73.9	75.4
	FSS		15.4	9.0	37.9	40.4	42.6	44.0	36.6	41.1	33.9	19.4
	NAVAIDS		33.9	44.3	63.8	51.5	52.3	47.2	45.5	43.9	42.3	40.9
	OTHER		16.9	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
	TOTAL P&E		188.4	202.8	275.0	307.1	292.5	241.5	239.1	248.2	247.8	238.8
O&M	CENTERS	OPS	293.0	297.3	299.1	302.7	321.0	335.3	343.5	353.7	364.9	378.1
	CENTERS	MAINT	181.9	190.7	197.7	206.0	218.5	228.3	233.8	240.7	248.4	257.4
	TOWERS	OPS	284.6	290.8	300.0	311.9	325.4	339.6	350.4	360.1	369.8	378.8
	TOWERS	MAINT	158.4	150.1	155.4	162.2	169.9	178.0	184.2	189.7	195.2	200.4
	FSS		107.2	107.2	107.2	105.0	102.9	100.7	98.6	96.5	94.3	92.2
	OTHER	OPS	37.5	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2
	OTHER	MAINT	25.1	25.6	26.5	27.6	29.1	30.5	31.4	32.3	33.3	34.3
	TOTAL O&M		1087.6	1099.8	1124.1	1153.5	1205.1	1250.6	1280.0	1311.1	1344.1	1379.4

TABLE 6-1

SAMPLE OF PRINTED INPUT VALUES (CONTD)

SUPPORT	I&M	136.1	144.3	147.0	150.9	158.7	165.7	170.3	175.2	180.3	185.8
	ADM F ST	142.3	150.7	154.7	158.6	163.4	168.5	173.1	176.8	181.7	186.6
	ADM MED	8.5	9.1	9.3	9.5	9.8	10.5	10.9	11.2	11.5	11.9
	DEV DIR	6.7	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
	A-P ADM	18.9	23.6	24.1	24.7	25.0	25.5	26.0	26.6	27.2	27.6
	CENT TRN	71.6	81.3	82.9	85.0	88.7	92.0	94.1	96.5	98.8	101.4
	DIR, S&S	140.8	146.3	148.6	151.6	157.0	161.6	164.8	168.1	171.5	175.3
	TOTAL SUPP	524.9	562.8	574.3	588.0	610.2	631.4	646.8	661.9	678.6	696.2
FE&D		20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
NTL CAP AP		28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
GRANTS		490.9	488.6	484.8	479.7	465.7	463.0	461.4	463.7	459.7	455.1
TOTAL		2410.1	2477.0	2581.2	2651.3	2696.5	2709.5	2750.3	2807.9	2853.2	2892.4

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT

TABLE F-1

ALLOCATION OF FY77 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		69.6	1.5	43.6	17.0	7.5
F&E	CENTERS	43.8	0.0	31.5	4.4	7.9
	TOWERS	78.4	1.5	41.5	25.4	10.0
	FSS	15.4	0.0	0.8	14.7	0.0
	NAVAIDS	33.9	0.0	18.3	11.2	4.4
	OTHER	16.9	0.0	11.4	5.6	0.0
	TOTAL F&E	188.4	1.5	103.5	61.2	22.3
O&M	CENTERS	474.9	51.7	234.1	98.2	91.0
	TOWERS	443.0	37.9	216.5	157.1	31.5
	FSS	107.2	3.6	5.4	87.7	10.5
	OTHER	62.5	6.2	27.6	20.7	8.0
	TOTAL O&M	1087.6	99.4	483.5	363.6	141.0
SUPPORT	I&M	136.1	36.1	48.9	36.8	14.3
	ADM F ST	142.3	142.3	0.0	0.0	0.0
	ADM MED	8.5	8.5	0.0	0.0	0.0
	DEV DIR	6.7	0.0	4.3	1.7	0.7
	A-P ADM	18.9	2.0	14.6	2.3	0.0
	CENT TRN	71.6	25.1	23.2	16.9	6.5
	DIR, S&S	140.8	30.2	59.5	37.0	14.1
	TOTAL SUP	524.9	244.3	150.4	94.7	35.5
F&ED		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		490.9	0.0	423.5	67.4	0.0
TOTAL		2410.1	395.4	1204.5	603.9	206.3
ADJUSTMENTS		0.0	0.0	12.0	-36.2	24.2
TOTAL		2410.1	395.4	1216.5	567.7	230.5

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY78 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	54.4	0.0	39.2	5.4	9.8
	TOWERS	67.7	1.5	35.7	21.8	8.6
	FSS	9.0	0.0	0.4	8.5	0.0
	NAVAIDS	44.3	0.0	23.9	14.6	5.8
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	202.8	1.5	117.7	59.5	24.2
O&M	CENTERS	488.0	52.3	238.9	108.3	88.5
	TOWERS	440.9	38.1	211.4	161.3	30.1
	FSS	107.2	3.6	5.3	87.9	10.4
	OTHER	63.7	6.2	27.8	21.8	7.9
	TOTAL O&M	1099.8	100.2	483.4	379.3	136.9
SUPPORT	I&M	144.3	37.1	51.8	40.7	14.7
	ADM F ST	150.7	150.7	0.0	0.0	0.0
	ADM MED	9.1	9.1	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	23.6	2.0	18.6	3.0	0.0
	CENT TRN	81.3	25.1	27.6	21.1	7.5
	DIR, S&S	146.3	30.2	61.7	40.1	14.3
	TOTAL SUP	562.8	254.1	164.5	106.7	37.4
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		488.6	0.0	420.7	67.8	0.0
TOTAL		2477.0	406.1	1232.9	631.6	206.4
ADJUSTMENTS		0.0	0.0	12.3	-37.6	25.3
TOTAL		2477.0	406.1	1245.3	594.0	231.7

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY79 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN BILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	65.2	0.0	47.0	6.5	11.7
	TOWERS	80.6	1.5	42.7	26.1	10.3
	FSS	37.9	0.0	1.9	36.0	0.0
	NAVAIDS	63.8	0.0	34.5	21.1	8.3
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	275.0	1.5	144.4	98.7	30.3
O&M	CENTERS	496.8	51.2	242.2	115.7	87.7
	TOWERS	455.5	39.2	217.2	169.0	30.0
	FSS	107.2	3.6	5.2	88.1	10.2
	OTHER	64.6	6.2	28.1	22.6	7.7
	TOTAL O&M	1124.1	100.2	492.7	395.4	135.7
SUPPORT	I&M	147.0	38.3	52.3	42.0	14.4
	ADM F ST	154.7	154.7	0.0	0.0	0.0
	ADM MED	9.3	9.3	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	24.1	2.0	19.1	3.1	0.0
	CENT TRN	82.9	25.1	28.2	22.0	7.5
	DIR, S&S	148.6	30.2	62.6	41.6	14.2
	TOTAL SUP	574.3	259.7	167.0	110.6	37.0
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		484.8	0.0	417.4	67.4	0.0
TOTAL		2581.2	411.6	1268.2	690.4	211.0
ADJUSTMENTS		0.0	0.0	12.7	-40.3	27.6
TOTAL		2581.2	411.6	1280.8	650.1	238.6

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY80 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	97.7	0.0	70.4	9.8	17.6
	TOWERS	90.0	1.5	47.8	29.2	11.5
	FSS	40.4	0.0	2.0	38.4	0.0
	NAVAIDS	51.5	0.0	27.8	17.0	6.7
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	307.1	1.5	166.4	103.4	35.8
O&M	CENTERS	508.7	51.2	245.2	125.3	86.9
	TOWERS	474.0	39.6	224.1	180.2	30.1
	FSS	105.0	3.6	5.1	86.3	10.0
	OTHER	65.8	6.2	28.4	23.5	7.6
	TOTAL O&M	1153.5	100.6	502.9	415.3	134.7
SUPPORT	I&M	150.9	39.3	53.3	44.0	14.3
	ADM F ST	158.6	158.6	0.0	0.0	0.0
	ADM MED	9.5	9.5	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	24.7	2.0	19.5	3.2	0.0
	CENT TRN	85.0	25.1	29.1	23.4	7.5
	DIR, S&S	151.6	30.2	63.7	43.6	14.2
	TOTAL SUP	588.0	264.8	170.4	116.1	36.8
F,E&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		479.7	0.0	412.9	66.8	0.0
TOTAL		2651.3	417.1	1299.2	719.8	215.2
ADJUSTMENTS		0.0	0.0	13.0	-41.8	28.8
TOTAL		2651.3	417.1	1312.2	678.0	244.0

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY81 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	75.9	0.0	54.7	7.6	13.7
	TOWERS	94.2	1.5	50.1	30.6	12.1
	FSS	42.6	0.0	2.1	40.5	0.0
	NAVAIDS	52.3	0.0	28.2	17.3	6.8
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	292.5	1.5	153.5	105.0	32.5
O&M	CENTERS	539.6	51.9	258.1	141.2	88.3
	TOWERS	495.3	39.6	232.9	192.8	30.1
	FSS	102.9	3.6	4.9	84.5	9.8
	OTHER	67.3	6.2	29.1	24.5	7.5
	TOTAL O&M	1205.1	401.3	525.0	443.1	135.7
SUPPORT	I&M	158.7	40.1	56.4	47.6	14.6
	ADM F ST	163.4	163.4	0.0	0.0	0.0
	ADM MED	9.8	9.8	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	25.0	2.0	19.7	3.3	0.0
	CENT TRN	88.7	25.1	30.7	25.3	7.7
	DIR, S&S	157.0	30.2	66.0	46.4	14.3
	TOTAL SUP	610.2	270.6	177.7	124.5	37.4
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		465.7	0.0	399.2	66.5	0.0
TOTAL		2696.5	423.7	1302.0	757.2	213.7
ADJUSTMENTS		0.0	0.0	13.0	-43.3	30.3
TOTAL		2696.5	423.7	1315.0	713.9	244.0

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY82 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN BILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	43.4	0.0	31.2	4.3	7.8
	TOWERS	79.5	1.5	42.1	25.7	10.1
	FSS	44.0	0.0	2.2	41.8	0.0
	NAVAIDS	47.2	0.0	25.5	15.6	6.1
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	241.5	1.5	119.4	96.5	24.1
O&M	CENTERS	563.6	54.0	268.7	152.0	88.9
	TOWERS	517.6	39.7	239.1	208.5	30.3
	FSS	100.7	3.6	4.8	82.7	9.6
	OTHER	68.6	6.2	29.5	25.5	7.4
	TOTAL O&M	1250.6	103.5	542.1	468.8	136.2
SUPPORT	I&M	165.7	41.6	58.6	50.7	14.7
	ADM F ST	168.5	168.5	0.0	0.0	0.0
	ADM MED	10.5	10.5	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	25.5	2.0	20.1	3.4	0.0
	CERT TRN	92.0	25.1	32.0	27.0	7.8
	DIR, S&S	161.6	30.2	67.9	49.1	14.4
	TOTAL SUP	631.4	277.9	183.6	132.1	37.8
PE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		463.0	0.0	396.3	66.6	0.0
TOTAL		2709.5	433.1	1288.0	782.2	206.1
ADJUSTMENTS		0.0	0.0	12.9	-44.2	31.3
TOTAL		2709.5	433.1	1300.9	738.0	237.4

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY83 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	54.2	0.0	39.0	5.4	9.8
	TOWERS	75.3	1.5	39.9	24.4	9.6
	FSS	36.6	0.0	1.8	34.8	0.0
	NAVAIDS	45.5	0.0	24.6	15.0	5.9
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	239.1	1.5	123.7	88.6	25.3
O&M	CENTERS	577.3	55.3	274.8	158.0	89.2
	TOWERS	534.6	39.9	245.5	218.9	30.3
	FSS	98.6	3.6	4.7	80.8	9.5
	OTHER	69.5	6.2	29.9	26.1	7.3
	TOTAL O&M	1280.0	105.0	555.0	483.8	136.2
SUPPORT	I&M	170.3	43.2	60.0	52.3	14.7
	ADM F ST	173.1	173.1	0.0	0.0	0.0
	ADM MED	10.9	10.9	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	26.0	2.0	20.5	3.5	0.0
	CENT TRN	94.1	25.1	33.0	28.1	7.9
	DIR, S&S	164.8	30.2	69.4	50.7	14.5
	TOTAL SUP	646.8	284.5	187.8	136.6	37.9
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		461.4	0.0	394.5	66.8	0.0
TOTAL		2750.3	441.2	1307.6	794.0	207.4
ADJUSTMENTS		0.0	0.0	13.1	-44.8	31.8
TOTAL		2750.3	441.2	1320.6	749.2	239.2

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY84 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	59.5	0.0	42.9	6.0	10.7
	TOWERS	76.2	1.5	40.4	24.7	9.7
	FSS	41.1	0.0	2.1	39.0	0.0
	NAVAIDS	43.9	0.0	23.7	14.5	5.7
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	248.2	1.5	127.4	93.2	26.1
O&M	CENTERS	594.4	55.2	282.6	166.8	89.9
	TOWERS	549.8	40.4	251.4	227.8	30.2
	FSS	96.5	3.6	4.6	79.0	9.3
	OTHER	70.4	6.2	30.3	26.6	7.3
	TOTAL O&M	1311.1	105.4	568.9	500.2	136.6
SUPPORT	I&M	175.2	44.8	61.5	54.1	14.8
	ADM F ST	176.8	176.8	0.0	0.0	0.0
	ADM MED	11.2	11.2	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	26.6	2.0	21.0	3.6	0.0
	CERT TRN	96.5	25.1	34.1	29.3	8.0
	DIR, S&S	168.1	30.2	70.9	52.4	14.6
	TOTAL SUP	661.9	290.0	192.4	141.3	38.2
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		463.7	0.0	396.5	67.1	0.0
TOTAL		2807.9	447.2	1331.8	820.0	208.9
ADJUSTMENTS		0.0	0.0	13.3	-46.1	32.8
TOTAL		2807.9	447.2	1345.1	773.9	241.7

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONTD)

TABLE F-1
(CONTINUED)

ALLOCATION OF FY85 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	70.3	0.0	50.6	7.0	12.7
	TOWERS	73.9	1.5	39.1	23.9	9.4
	FSS	33.9	0.0	1.7	32.2	0.0
	NAVAIDS	42.3	0.0	22.8	14.0	5.5
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	247.8	1.5	132.6	86.1	27.6
O&M	CENTERS	613.3	56.4	292.6	174.0	90.2
	TOWERS	565.0	40.7	258.6	235.8	30.0
	FSS	94.3	3.6	4.5	77.1	9.1
	OTHER	71.4	6.2	30.9	27.1	7.2
	TOTAL O&M	1344.1	106.9	586.6	514.0	136.5
SUPPORT	I&M	180.3	46.4	63.5	55.6	14.8
	ADM F ST	181.7	181.7	0.0	0.0	0.0
	ADM MED	11.5	11.5	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	27.2	2.0	21.5	3.6	0.0
	CENT TRN	98.8	25.1	35.4	30.3	8.0
	DIR, S&S	171.5	30.2	72.8	53.9	14.6
	TOTAL SUP	678.6	296.9	198.0	145.5	38.2
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		459.7	0.0	393.2	66.5	0.0
TOTAL		2853.2	455.5	1357.1	830.3	210.3
ADJUSTMENTS		0.0	0.0	13.6	-46.8	33.2
TOTAL		2853.2	455.5	1370.6	783.6	243.5

TABLE 6-2

SAMPLE OF ALLOCATION OUTPUT (CONCLUDED)

TABLE F-1
(CONCLUDED)

ALLOCATION OF FY86 BASELINE PROGRAM COSTS
FY76 CONSTANT DOLLARS IN MILLIONS

		TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D		74.3	1.5	46.6	18.2	8.0
F&E	CENTERS	75.7	0.0	54.5	7.6	13.6
	TOWERS	75.4	1.5	39.9	24.4	9.6
	FSS	19.4	0.0	1.0	18.4	0.0
	NAVAIDS	40.9	0.0	22.1	13.5	5.3
	OTHER	27.4	0.0	18.4	9.1	0.0
	TOTAL F&E	238.8	1.5	135.8	72.9	28.5
O&M	CENTERS	635.5	57.5	304.9	182.5	90.6
	TOWERS	579.2	40.8	265.7	242.8	29.8
	FSS	92.2	3.6	4.4	75.3	8.8
	OTHER	72.5	6.2	31.6	27.5	7.1
	TOTAL O&M	1379.4	108.1	606.6	528.3	136.4
SUPPORT	I&M	185.8	47.9	65.8	57.3	14.8
	ADM F ST	186.6	186.6	0.0	0.0	0.0
	ADM MED	11.9	11.9	0.0	0.0	0.0
	DEV DIR	7.6	0.0	4.9	1.9	0.8
	A-P ADM	27.6	2.0	21.9	3.7	0.0
	CENT TRN	101.4	25.1	36.8	31.4	8.1
	DIR, S&S	175.3	30.2	74.9	55.5	14.7
	TOTAL SUP	696.2	303.7	204.3	149.8	38.3
FE&D		20.3	20.3	0.0	0.0	0.0
NTL CAP AP		28.4	28.4	0.0	0.0	0.0
GRANTS		455.1	0.0	388.8	66.2	0.0
TOTAL		2892.4	463.6	1382.1	835.4	211.3
ADJUSTMENTS		0.0	0.0	13.8	-47.2	33.4
TOTAL		2892.4	463.6	1396.0	788.2	244.7

APPENDIX A

PROGRAM LISTINGS

Table A-1 includes listings of the main program and the six subroutines which comprise the allocation program package. The main program, called COSTALL, appears first and is followed, in order of execution, by the remaining subroutines. In some cases, the primary subroutines call secondary subroutines which may be either internal or external to the primary subroutines. Listings for all code in the program package are included in Table A-1.

TABLE A-1

PROGRAM LISTINGS

```
COSTALL: PROCEDURE OPTIONS (MAIN);
DECLARE RESPONSE CHARACTER(3) INITIAL ('NO');
DECLARE (FYEAR, LYEAR, CSTLIKE(20), DFLTR(20), ICASE, ACTNUM(20),
   NYEAR, NRUN) FIXED BINARY STATIC EXTERNAL;
DECLARE (ALLDATA(20,4), GROSS(40,10), ACTIVTY(5,10,4), DEFLATE(5,10),
   SAVALLO(20,10,4), ALLO(20,10,4), PARAM(20,10,4), E(4)) FLOAT(6)
   STATIC EXTERNAL;
DECLARE TYPCOST(20) CHARACTER(2) STATIC EXTERNAL;
DECLARE (J, K) FIXED BINARY;
DECLARE (DESCRIP(40,3), DPTYPE(5), USER(4)) CHARACTER(10) STATIC
   EXTERNAL;
DECLARE CASENAM CHARACTER(12) STATIC EXTERNAL;
DECLARE TABLENO(4) CHARACTER(3) STATIC EXTERNAL;
DECLARE (INITIAL, INPUT, MODIFY, FRINPUT, ALLOCAT, PRINT) ENTRY;
CALL INITIAL;
GET EDIT (CASENAM, (TABLENO(K) DO K=1 TO 4), (USER(J) DO J=1 TO 4))
   (COL(1), A(12), 4(X(1), A(3)), 4(A(10)));
DO WHILE (CASENAM ¬= ' ');
    CALL INPUT;
    DISPLAY ('DO YOU WANT TO RUN THIS CASE?') REPLY (RESPONSE);
    DO WHILE (RESPONSE ¬= 'YES' & RESPONSE ¬= 'NO');
        DISPLAY ('PLEASE ANSWER YES OR NO') REPLY (RESPONSE);
        END;
    IF RESPONSE = 'NO' THEN DO;
        DISPLAY ('DO YOU WANT TO MODIFY THE DATA AND THEN RUN THIS ' ||
           'CASE?') REPLY (RESPONSE);
        DO WHILE (RESPONSE ¬= 'YES' & RESPONSE ¬= 'NO');
            DISPLAY ('PLEASE ANSWER YES OR NO') REPLY (RESPONSE);
            END;
        IF RESPONSE = 'YES' THEN CALL MODIFY;
        END;
    DO WHILE (RESPONSE = 'YES');
        CALL FRINPUT;
        CALL ALLOCAT;
        CALL PRINT;
        DISPLAY ('DO YOU WANT TO MODIFY THE DATA AND RUN THIS CASE ' ||
           'AGAIN?') REPLY (RESPONSE);
        DO WHILE (RESPONSE ¬= 'YES' & RESPONSE ¬= 'NO');
            DISPLAY ('PLEASE ANSWER YES OR NO') REPLY (RESPONSE);
            END;
        IF RESPONSE = 'YES' THEN CALL MODIFY;
        END;
    GET EDIT (CASENAM, (TABLENO(K) DO K=1 TO 4), (USER(J) DO J=1 TO 4))
       (COL(1), A(12), 4(X(1), A(3)), 4(A(10)));
    END;
END COSTALL;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
INITIAL: PROCEDURE;
DECLARE ENVDATA FILE INPUT STREAM ENVIRONMENT(F,RECSIZE(80));
DECLARE (ACTIVTY(5,10,4), DEFLATE(5,10), E(4)) FLOAT(6) STATIC
   EXTERNAL;
DECLARE (NYEAR, FYEAR, LYEAR, NRUN) FIXED BINARY STATIC EXTERNAL;
DECLARE (PERCENT(4), SMALCOM(3), RATIO(3)) FLOAT(6);
DECLARE (I, J, K, M) FIXED BINARY;
DECLARE DFTYPE(5) CHARACTER(10) STATIC EXTERNAL;
DECLARE ACTYPE(5) CHARACTER(20);
DECLARE PCFLAG CHARACTER(1);
DEFLATE=0;
M=0;
NRUN = 2;
GET FILE (ENVDATA) EDIT (FYEAR, LYEAR) (COL(1), F(4), X(1), F(4));
NYEAR = LYEAR - FYEAR + 1;
DO I=1 TO 5;
    GET FILE (ENVDATA) EDIT (DFTYPE(I)) (COL(1), A(10));
    IF I=1 & DFTYPE(I) = 'NO DEFLATO' THEN DO;
        NRUN = 1;
        I = 5;
        END;
    ELSE IF DFTYPE(I) = ' ' THEN I=5;
    ELSE IF SUBSTR(DFTYPE(I),1,8) ¬= 'LIN COMB' THEN DO;
        GET FILE (ENVDATA) EDIT ((DEFLATE(I,J) DO J=1 TO NYEAR))
            (COL(1), 10(F(7,3), X(1)));
        M = M + 1;
        END;
    ELSE DO;
        GET FILE (ENVDATA) EDIT ((RATIO(K) DO K=1 TO M))
            (COL(1), 10(F(7,3), X(1)));
        DO J=1 TO NYEAR;
            DO K=1 TO M;
                DEFLATE(I,J) = DEFLATE(I,J) + RATIO(K)*DEFLATE(K,J);
                END;
            END;
        END;
    END;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
IF DEFLATE(1,1) ¬= 0 THEN PUT PAGE EDIT ('DEFLATORS', (J DO J=FYEAR TO
   LYEAR), (DFTYPE(I), (DEFLATE(I,J) DO J=1 TO NYEAR) DO I=1 TO 5))
   (COL(55), A(9), SKIP(2), COL(21), 10(X(6), F(4)), SKIP(2), 5(COL(1),
   A(20), 10(F(10,3))));
DO I=1 TO 5;
    GET FILE (ENVDATA) EDIT (ACTYPE(I), PCFLAG) (COL(1), A(20), A(1));
    IF ACTYPE(I) = ' ' THEN I=5;
    ELSE IF PCFLAG = '*' THEN DO;
        GET FILE (ENVDATA) EDIT ((PERCENT(K) DO K=1 TO 4),
            (ACTIVTY(I,J,4) DO J=1 TO NYEAR))
            (COL(1), 4(F(7,3), X(1)), COL(1), 10(F(7,3), X(1)));
        DO K=1 TO 4;
            DO J=1 TO NYEAR;
                ACTIVTY(I,J,K) = ACTIVTY(I,J,4)*PERCENT(K);
                END;
            END;
        END;
    ELSE GET FILE (ENVDATA) EDIT (((ACTIVTY(I,J,K) DO J=1 TO NYEAR)
       DO K=1 TO 4)) (4(COL(1), 10(F(7,3), X(1))));
    END;
PUT SKIP(3) EDIT ('ACTIVITY STATISTICS', (ACTYPE(I), ((ACTIVTY(I,J,K)
   DO J=1 TO 10) DO K=1 TO 4) DO I=1 TO 5)) (COL(51), A(19), SKIP(2),
   5(COL(1), A(20), 10(F(10,3)), 3(COL(21), 10(F(10,3)))));
GET FILE (ENVDATA) EDIT ((E(K) DO K=1 TO 4), (SMALCOM(K) DO K=1 TO 3))
   (COL(1), 4(F(7,3), X(1)), COL(1), 3(F(7,3), X(1)));
DO J=1 TO NYEAR;
    DO K=1 TO 3;
        ACTIVTY(2,J,K) = ACTIVTY(2,J,K) - SMALCOM(K);
        END;
    END;
END INITIAL;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
INPUT: PROCEDURE;
DECLARE (I, J, K, N) FIXED BINARY;
DECLARE (GROSS(40,10), PARAM(20,10,4), ALLDATA(20,4), DEFLATE(5,10),
   SAVALLO(20,10,4), ALLO(20,10,4)) FLOAT(6) STATIC EXTERNAL;
DECLARE (NYEAR, ICASE, CSTLIKE(20), DFLTR(20), ACTNUM(20)) FIXED BINARY
   STATIC EXTERNAL;
DECLARE DESCRIP(40,3) CHARACTER(10) STATIC EXTERNAL;
DECLARE CASENAM CHARACTER(12) STATIC EXTERNAL;
DECLARE TYPCOST(20) CHARACTER(2) STATIC EXTERNAL;
DECLARE FLAG CHARACTER(1);
ICASE = 0;
PARAM, ALLO=0;
ALLDATA=0;
N=21;
DISPLAY ('NEXT CASE: ' || CASENAM);
DO I=1 TO 20;
    GET EDIT ((DESCRIP(I,J) DO J=1 TO 3), TYPCOST(I), CSTLIKE(I),
       DFLTR(I), FLAG, ACTNUM(I)) (COL(1), 3(A(10)), X(1), A(2), F(2),
       X(6), F(2), A(1), F(1));
    IF CSTLIKE(I) = 0 THEN IF TYPCOST(I) = 'E' | TYPCOST(I) = 'M' |
       TYPCOST(I) = 'MM' THEN GET EDIT ((ALLDATA(I,K) DO K=1 TO 4))
       (X(3), 4(F(7,3), X(1)));
    GET EDIT ((GROSS(I,J) DO J=1 TO NYEAR)) (COL(1), 10(F(7,3), X(1)));
    IF DESCRIP(I,3) ¬= ' ' THEN DO;
        GET EDIT ((DESCRIP(N,J) DO J=1 TO 3)) (COL(1), 3(A(10)));
        GET EDIT ((GROSS(N,J) DO J=1 TO NYEAR))
           (COL(1), 10(F(7,3), X(1)));
        N = N + 1;
        END;
    IF FLAG = '*' THEN GET EDIT (((ALLO(I,J,K) DO J=1 TO NYEAR) DO K=1
       TO 4)) (4(COL(1), 10(F(7,3), X(1))));
    IF FLAG = 'P' THEN GET EDIT ((ALLO(I,J,4) DO J=1 TO NYEAR))
       (COL(1), 10(F(7,3), X(1)));
    IF TYPCOST(I) = 'G' & CSTLIKE(I) = 0 THEN DO J=1 TO NYEAR;
        GROSS(I,J) = GROSS(I,J)/DEFLATE(DFLTR(I),J);
        DO K=1 TO 4;
            ALLO(I,J,K) = ALLO(I,J,K)/DEFLATE(DFLTR(I),J);
            END;
        END;
    END;
SAVALLO = ALLO;
END INPUT;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
PRINPUT: PROCEDURE;
DECLARE (GROSS(40,10), DEFLATE(5,10), ALLO(20,10,4)) FLOAT(6) STATIC
   EXTERNAL;
DECLARE (FYEAR, LYEAR, DFLTR(20), NYEAR, NRUN) FIXED BINARY STATIC
   EXTERNAL;
DECLARE DESCRIP(40,3) CHARACTER(10) STATIC EXTERNAL;
DECLARE CASENAM CHARACTER(12) STATIC EXTERNAL;
DECLARE TABLENO(4) CHARACTER(3) STATIC EXTERNAL;
DECLARE (GTOTAL(10), TOTAL(10), DUMMY(10)) FLOAT(6);
DECLARE (I, J, K, M, N, LINECNT) FIXED BINARY;
DECLARE (LABEL, OLDNAM) CHARACTER(10);
DECLARE DLTYPE(2) CHAR(13) INITIAL ('FY76 CONSTANT', '      CURRENT');
DECLARE L(2) FIXED BINARY INITIAL(45, 42);
DO N=1 TO NRUN;
    M = 21;
    LINECNT = 0;
    GTOTAL, TOTAL=0;
    PUT PAGE EDIT ('TABLE ', TABLENO(N), CASENAM, ' TOTAL COSTS',
       DLTYPE(N), ' DOLLARS (MILLIONS)', (J DO J=FYEAR TO LYEAR))
       (COL(56), A(6), A(3), SKIP(2), COL(49), 2(A(12)), COL(L(N)),
       A(13), A(19), SKIP(2), COL(31), 10(X(5), F(4)));
    PUT SKIP;
    OLDNAM = DESCRIP(1,1);
    DO I=1 TO 20;
        IF DESCRIP(I,1) ¬= OLDNAM THEN DO;
            IF LINECNT>1 THEN PUT SKIP(2) EDIT ('TOTAL ',
               SUBSTR(OLDNAM,1,4),(TOTAL(J) DO J=1 TO NYEAR))
               (COL(11), A(6), A(4), X(10), 10(F(9,1)));
            PUT SKIP(2);
            LINECNT = 0;
            TOTAL = 0;
            END;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
        IF LINECNT=0 THEN LABEL = DESCRIP(I,1);
        ELSE LABEL = ' ';
        CALL LINE (I);
        IF DESCRIP(I,3) ¬= ' ' THEN DO;
            LABEL = ' ';
            CALL LINE (M);
            DO J=1 TO NYEAR;
                IF N=2 THEN DO;
                    GROSS(I,J) = GROSS(I,J) + GROSS(M,J);
                    END;
                END;
            M = M + 1;
            END;
        OLDNAM = DESCRIP(I,1);
        END;
    PUT SKIP(3) EDIT ('TOTAL', (GTOTAL(J) DO J=1 TO 10))
       (COL(1), A(5), X(25), 10(F(9,1)));
    END;
LINE: PROCEDURE (L);
DECLARE L FIXED BINARY;
DO J=1 TO NYEAR;
    IF N=1 THEN DUMMY(J) = GROSS(I,J);
    ELSE DUMMY(J) = GROSS(L,J)*DEFLATE((DFLTR(I)),J);
    TOTAL(J) = TOTAI(J) + DUMMY(J);
    GTOTAL(J) = GTOTAL(J) + DUMMY(J);
    END;
PUT SKIP EDIT (LABEL, DESCRIP(L,2), DESCRIP(L,3), (DUMMY(J) DO J=1 TO
   NYEAR)) (COL(1), 3(A(10)), 10(F(9,1)));
LINECNT = LINECNT + 1;
END LINE;
END PRINPUT;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
ALLOCAT: PROCEDURE;
DECLARE (TOTAL(4), TTL(4), TOTALL) FLOAT(6);
DECLARE (I, J, K) FIXED BINARY;
DECLARE (ALLO(20,10,4), PARAM(20,10,4), ACTIVTY(5,10,4), GROSS(40,10),
   E(4), ALLDATA(20,4)) FLOAT(6) STATIC EXTERNAL;
DECLARE TYPCOST(20) CHARACTER(2) STATIC EXTERNAL;
DECLARE (NYEAR, CSTLIKE(20), ACTNUM(20)) FIXED BINARY STATIC EXTERNAL;
DO J=1 TO NYEAR;
    TTL = 0;
    DO I=1 TO 20;
        TOTAL = 0;
        IF TYPCOST(I) = 'E' & CSTLIKE(I) = 0 THEN DO K=1 TO 4;
            PARAM(I,J,K) = ALLDATA(I,K);
            END;
        IF (TYPCOST(I) = 'M' | TYPCOST(I) = 'MM') & CSTLIKE(I) = 0
           THEN CALL ALLOM;
        IF TYPCOST(I) = 'G' & CSTLIKE(I) = 0 THEN DO;
            ALLO(I,J,1) = ALLO(I,J,1) + ALLO(I,J,1)*ALLO(I,J,2)/
                (ALLO(I,J,1) + ALLO(I,J,3));
            ALLO(I,J,3) = ALLO(I,J,3) + ALLO(I,J,2)*ALLO(I,J,3)/
                (ALLO(I,J,1) + ALLC(I,J,3));
            ALLO(I,J,2) = 0;
            DO K=1 TO 3;
                PARAM(I,J,K) = ALLO(I,J,K)/(ALLO(I,J,1) + ALLO(I,J,3));
                END;
            END;
        IF TYPCOST(I) = 'P' THEN PARAM(I,J,4) = 1;
        END;
    DO I=1 TO 20;
        IF TYPCOST(I) = 'MA' THEN DO K=1 TO 4;
            PARAM(I,J,K) = TTL(K)/(TTL(1) + TTL(2) + TTL(3) + TTL(4));
            END;
        IF CSTLIKE(I) ¬= 0 THEN DC K=1 TO 4;
            PARAM(I,J,K) = PARAM((CSTLIKE(I)),J,K);
            END;
        TOTALL = ALLO(I,J,1) + ALIO(I,J,2) + ALLO(I,J,3) + ALLO(I,J,4);
        DO K=1 TO 4;
            ALLO(I,J,K) = ALLO(I,J,K)+PARAM(I,J,K)*(GROSS(I,J)-TOTALL);
            END;
        END;
    END;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
ALLOM: PROCEDURE;
DECLARE (MC(4), RESID, SURCHRG(4), DIVISOR) FLOAT(6);
TOTALL = ALLO(I,J,1) + ALLO(I,J,2) + ALLO(I,J,3) + ALLO(I,J,4);
RESID = GROSS(I,J) - TOTALL;
IF TYPCOST(I) = 'M' THEN DO;
    DO K=1 TO 4;
        MC(K) = ALLDATA(I,K)*ACTIVTY((ACTNUM(I)),J,K);
        RESID = RESID - MC(K);
        IF K=1 THEN DIVISOR = MC(K);
        ELSE IF E(K) ¬= 0 THEN DIVISOR = DIVISOR + (E(1)*MC(K)/E(K));
        END;
    SURCHRG(1) = RESID/DIVISOR;
    DO K=1 TO 4;
        IF K>1 THEN IF E(K) = 0 THEN SURCHRG(K) = 0;
        ELSE SURCHRG(K) = E(1)*SURCHRG(1)/E(K);
        TOTAL(K) = TOTAL(K) + MC(K)*(1 + SURCHRG(K));
        END;
    END;
ELSE DO;
    DO K=1 TO 4;
        MC(K) = 1.552*(ALLDATA(I,1)*ACTIVTY(3,J,K) + ALLDATA(I,2)*
           ACTIVTY(4,J,K) + ALLDATA(I,3)*ACTIVTY(5,J,K));
        RESID = RESID - MC(K);
        END;
    DO K=1 TO 4;
        TOTAL(K) = MC(K) + RESID*MC(K)/(MC(1) + MC(2) + MC(3) + MC(4));
        END;
    END;
DO K=1 TO 4;
    PARAM(I,J,K) = TOTAL(K)/(GROSS(I,J) - TOTALL);
    TTL(K) = TTL(K) + TOTAL(K);
    END;
END ALLOM;
END ALLOCAT;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
PRINT: PROCEDURE;
DECLARE (NYEAR, NRUN, ICASE, DFLTR(20)) FIXED BINARY STATIC EXTERNAL;
DECLARE (GROSS(40,10), ALLO(20,10,4), DEFLATE(5,10), SAVALLO(20,10,4))
   FLOAT(6) STATIC EXTERNAL;
DECLARE TABLENO(4) CHARACTER(3) STATIC EXTERNAL;
DECLARE (USER(4), DESCRIP(40,3)) CHARACTER(10) STATIC EXTERNAL;
DECLARE LABEL CHARACTER(11);
DECLARE CASENAM CHARACTER(12) STATIC EXTERNAL;
DECLARE (I, J, K, L, N) FIXED BINARY;
DECLARE TABLE ENTRY (FIXED BINARY, FIXED BINARY);
DECLARE DLTYPE(2) CHAR(13) INITIAL ('FY76 CONSTANT', '      CURRENT');
DECLARE M(2) FIXED BINARY INITIAL (28, 25);
DO N=1 TO NRUN;
    DO J=1 TO NYEAR;
        PUT PAGE EDIT ('TABLE ', TABLENO((N+2))) (COL(41), A(6), A(3));
        IF J>1 THEN DO;
            IF J=10 THEN LABEL = '(CONCLUDED)';
            ELSE LABEL = '(CONTINUED)';
            PUT SKIP EDIT (LABEL) (COL(40), A(11));
            END;
        PUT SKIP(2) EDIT ('ALLOCATION OF FY', (J+76), CASENAM, ' PROG',
           'RAM COSTS', DLTYPE(N), ' DOLLARS IN MILLIONS') (COL(23),
           A(16), F(2), A(12), A(5), A(9), COL(M(N)), A(13), A(20));
        IF ICASE > 0 THEN PUT SKIP EDIT ('MODIFICATION ', ICASE)
           (COL(38), A(13), F(1));
        PUT SKIP(2) EDIT ('TOTAL', USER(4), USER(1), USER(3), USER(2))
           (COL(1), X(25), A(5), 4(X(5), A(10)));
        CALL TABLE (J, N);
        END;
    END;
DISPLAY ('RUN COMPLETE.');
L=21;
DO I=1 TO 20;
    IF DESCRIP(I,3) ¬= ' ' THEN DO;
        DO J=1 TO NYEAR;
            GROSS(I,J) = GROSS(I,J) - GROSS(L,J);
            END;
        L = L + 1;
        END;
    END;
ALLO = SAVALLO;
END PRINT;
```

TABLE A-1

PROGRAM LISTINGS (CONTD)

```
TABLE: PROCEDURE (J, N);
DECLARE DESCRIP(40,3) CHARACTER(10) STATIC EXTERNAL;
DECLARE (I, J, K, LINECNT, N) FIXED BINARY;
DECLARE (DUM(5), SUBTOTAL(5), TOTAL(5), ADJUST(5), NTOTAL(5), FACTOR)
   FLOAT;
DECLARE DFLTR(20) FIXED BINARY STATIC EXTERNAL;
DECLARE (GROSS(40,10), ALLO(20,10,4), DEFLATE(5,10)) FLOAT(6) STATIC
   EXTERNAL;
DECLARE OLDNAME CHARACTER(10);
SUBTOTAL, TOTAL, ADJUST = 0;
LINECNT=0;
OLDNAME = DESCRIP(1,1);
DO I=1 TO 20;
    IF DESCRIP(I,1) ¬= OLDNAME THEN DO;
        IF LINECNT>1 THEN PUT SKIP(2) EDIT ('TOTAL', SUBSTR(OLDNAME,1,
           3), (SUBTOTAL(K) DO K=1 TO 5)) (COL(1), X(10), A(6), A(4),
           4(F(10,1), X(5)), F(10,1));
        LINECNT=0;
        SUBTOTAL=0;
        OLDNAME = DESCRIP(I,1);
        END;
    IF N=1 THEN FACTOR = 1.;
    ELSE FACTOR = DEFLATE(DFLTR(I),J);
    DUM(1) = GROSS(I,J)*FACTOR;
    DUM(2) = ALLO(I,J,4)*FACTOR;
    DUM(3) = ALLO(I,J,1)*FACTOR;
    DUM(4) = ALLO(I,J,3)*FACTOR;
    DUM(5) = ALLO(I,J,2)*FACTOR;
    IF LINECNT = 0 THEN PUT SKIP(3) EDIT (DESCRIP(I,1))(COL(1), A(10));
    PUT EDIT (DESCRIP(I,2), (DUM(K) DO K=1 TO 5)) (COL(11), A(10),
       4(F(10,1), X(5)), F(10,1));
    LINECNT = LINECNT + 1;
    DO K=1 TO 5;
        SUBTOTAL(K) = SUBTOTAL(K) + DUM(K);
        TOTAL(K) = TOTAL(K) + DUM(K);
        END;
    END;
ADJUST(3) = TOTAL(3)*.01;
ADJUST(5) = TOTAL(4)*.04;
ADJUST(4) = -1*(ADJUST(3) + ADJUST(5));
DO K=1 TO 5;
    NTOTAL(K) = TOTAL(K) + ADJUST(K);
    END;
PUT SKIP(3) EDIT ('TOTAL', (TOTAL(K) DO K=1 TO 5), 'ADJUSTMENTS',
   (ADJUST(K) DO K=1 TO 5), 'TOTAL', (NTOTAL(K) DO K=1 TO 5))
   (3(CCL(1), A(11), X(9), 4(F(10,1), X(5)), F(10,1)));
END TABLE;
```

TABLE A-1

PROGRAM LISTINGS (CONCLUDED)

```
MODIFY: PROCEDURE;
DECLARE INTERM FILE INPUT STREAM ENVIRONMENT(F,RECSIZE(80));
DECLARE OUTERM FILE OUTPUT STREAM ENVIRONMENT(F,RECSIZE(80));
DECLARE ICASE FIXED BINARY STATIC EXTERNAL;
DECLARE VALUE FLOAT(6);
DECLARE (I, J, K, L, M) FIXED BINARY;
DECLARE (ALLO(20,10,4), ALLDATA(20,4), GROSS(40,10)) FLOAT(6) STATIC
   EXTERNAL;
DECLARE RESPONSE CHARACTER(3);
DECLARE SAME CHARACTER(21) INITIAL ('ARE YOU CHANGING ANY ');
DECLARE LABEL(3) CHARACTER(22) INITIAL ('COSTS?', 'PRIOR ALLOCATIONS?',
   'ALLOCATION PARAMETERS?');
DECLARE (USER(4), DESCRIP(40,3)) CHARACTER(10) STATIC EXTERNAL;
ICASE = ICASE + 1;
DO M=1 TO 3;
    DISPLAY (SAME || LABEL(M)) REPLY (RESPONSE);
    DO WHILE (RESPONSE ¬= 'YES' & RESPONSE ¬= 'NO');
        DISPLAY ('PLEASE ANSWER YES OR NO') REPLY (RESPONSE);
        END;
    DO WHILE (RESPONSE = 'YES');
        IF M ¬= 1 THEN DO;
            DISPLAY ('WHICH USER GROUP IS BEING CHANGED?');
            PUT FILE (OUTERM) EDIT (((I, ' = ', USER(I)) DO I=1 TO 4))
               (4(COL(1), F(1), A(3), A(10)));
            GET FILE (INTERM) LIST (K);
            END;
        IF M ¬= 3 THEN DO;
            DISPLAY ('WHICH YEAR IS BEING CHANGED?');
            GET FILE (INTERM) LIST (J);
            J = J - 1976;
            END;
        DISPLAY ('ENTER COST CATEGORY TO BE CHANGED');
        PUT FILE (OUTERM) EDIT (((I, ' = ', (DESCRIP(I,L) DO L=1 TO 2))
           , ((I+10), ' = ', (DESCRIP((I+10),L) DO L=1 TO 2)) DO I=1 TO
           10)) (10(COL(1), F(2), A(3), 2(A(10)), X(15), F(2), A(3),
           2(A(10))));
        GET FILE (INTERM) LIST (I);
        DISPLAY ('ENTER NEW VALUE FOR THIS ITEM');
        GET FILE (INTERM) LIST (VALUE);
        IF M=1 THEN GROSS(I,J) = VALUE;
        IF M=2 THEN ALLO(I,J,K) = VALUE;
        IF M=3 THEN ALLDATA(I,K) = VALUE;
        DISPLAY (SAME || 'MORE ' || LABEL(M)) REPLY (RESPONSE);
        END;
    END;
END MODIFY;
```

APPENDIX B

GLOSSARY

A.C./ AC	AIR CARRIER
A-P/ AP/ ARPT	AIRPORT
AAT	FAA AIR TRAFFIC SERVICE
ADAP	AIRPORT DEVELOPMENT AID PROGRAM
ADM/ ADMIN	ADMINISTRATION
ADV	ADVISORY
AFTN	AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK
AOPA	AIRCRAFT OWNERS AND PILOTS ASSOCIATION
ARSR	AIR ROUTE SURVEILLANCE RADAR
ARTCC	AIR ROUTE TRAFFIC CONTROL CENTER
ARTS	AUTOMATED RADAR TRAFFIC CONTROL SYSTEM
ASC	ADMINISTRATIVE SCIENCES CORPORATION
ASR	AIRPORT SURVEILLANCE RADAR
ATC	AIR TRAFFIC CONTROL
AVP	FAA OFFICE OF AVIATION POLICY
C-AP	CAPITOL AIRPORTS
CAB	CIVIL AERONAUTICS BOARD (SEE ALSO TRACAB)
CAP	CAPITOL
CENT	CENTRALIZED
CONUS	CONTINENTAL UNITED STATES
CSC	COMPUTER SCIENCES CORPORATION
CTR	CENTER (EN ROUTE)
DCA	WASHINGTON NATIONAL AIRPORT
DCS	DATA COMMUNICATIONS SYSTEM
DEV	DEVELOPMENT
DIR	DIRECTION
DME	DISTANCE MEASURING EQUIPMENT
DOD	DEPARTMENT OF DEFENSE
DOT	DEPARTMENT OF TRANSPORTATION
E&D	ENGINEERING AND DEVELOPMENT
F ST/ FLT STDS	FLIGHT STANDARDS
F&E	FACILITIES AND EQUIPMENT
F,E&D	FACILITIES, ENGINEERING AND DEVELOPMENT
FAA	FEDERAL AVIATION ADMINISTRATION
FAC	FACILITY
FREQ	FREQUENCY
FSS	FLIGHT SERVICE STATIONS
FY	FISCAL YEAR
G.A./ GA	GENERAL AVIATION
GAMA	GENERAL AVIATION MANUFACTURERS ASSOCIATION

APPENDIX B

GLOSSARY (Contd)

GOVT	GOVERNMENT
GRANTS	GRANTS-IN-AID
I&M/ IN & MAT	INSTALLATION AND MATERIAL
IAD	DULLES INTERNATIONAL AIRPORT
IFR	INSTRUMENT FLIGHT RULES
ILS	INSTRUMENT LANDING SYSTEM
JFK	JOHN F. KENNEDY INTERNATIONAL AIRPORT
LRIC	LONG RUN INCREMENTAL COST
LRMC	LONG RUN MARGINAL COST
MAINT	MAINTENANCE
MDW	CHICAGO MIDWAY AIRPORT
MED	MEDICAL (PROGRAMS)
MIL	MILITARY
MSL	MEAN SEA LEVEL
NAFEC	NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER
NAS	NATIONAL AIRSPACE SYSTEM
NASA	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
NASP	NATIONAL AVIATION SYSTEM PLAN
NATL/ NTL	NATIONAL
NAVAIDS	NAVIGATION AIDS
NBAA	NATIONAL BUSINESS AIRCRAFT ASSOCIATION
NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NWS	NATIONAL WEATHER SERVICE
O&M	OPERATIONS AND MAINTENANCE
OPS	OPERATIONS
ORD	CHICAGO O'HARE INTERNATIONAL AIRPORT
OST	OFFICE OF THE SECRETARY OF TRANSPORTATION
PATWAS	PILOT'S AUTOMATIC TELEPHONE WEATHER ANSWERING SERVICE
PGP	AIRPORT PLANNING GRANT PROGRAM
R&D	RESEARCH AND DEVELOPMENT
R&M	RELOCATION AND MODIFICATION
R,E&D	RESEARCH, ENGINEERING AND DEVELOPMENT
RCAG	REMOTE COMMUNICATIONS, AIR TO GROUND
RCS	RADIO COMMUNICATIONS SYSTEM
RTR	REMOTE TRANSMITTER/RECEIVER
S.E.E.	STANDARD ESTIMATE OF ERROR

APPENDIX B

GLOSSARY (Contd)

S&S	STAFF AND SUPPORT
SRMC	SHORT RUN MARGINAL COSTS
SUP	SUPPORT
TACAN	TACTICAL AIR NAVIGATION AID
TCS	TECHNICAL CONTROL SERVICE
TR	TRAFFIC
TRACAB	TERMINAL RADAR CONTROL FACILITY COLOCATED WITH A CONTROL TOWER
TRACON	TERMINAL RADAR CONTROL FACILITY
TRN	TRAINING
TWEB	TRANSCRIBED WEATHER BROADCASTS
TWR	TOWER (TERMINAL)
U.S.	UNITED STATES
UG3RD	UPGRADED THIRD GENERATION
UHF	ULTRA HIGH FREQUENCY
UNICOM	AERONAUTICAL ADVISORY STATION
VCS	VOICE COMMUNICATIONS SYSTEM
VFR	VISUAL FLIGHT RULES
VHF	VERY HIGH FREQUENCY
VOR	VHF OMNI-RANGE (NAVIGATION AID)
VORTAC	COLOCATED VOR AND TACAN

APPENDIX C

REFERENCES

1. Fain, R. L., Garvett, D. S., "Airport and Airway Cost Allocation," The MITRE Corporation, MTR-7610, Volume IV, September 1977.

APPENDIX D

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